

LIQUID WASTE OPERATIONS

A supplement to the
SRS Environmental Report for 2011



A URS COMPANY TEAMED WITH BECHTEL | CH2M HILL | B&W | AREVA

Savannah River Remediation (SRR), the liquid waste operations contractor at the Savannah River Site (SRS), continued the SRS tradition of posting another exemplary environmental compliance record in 2011, as liquid waste operations continued to minimize impact to the off-site public and the surrounding environment.

Liquid Waste Operations

High-activity waste is highly radioactive liquid waste that results primarily from the reprocessing of spent nuclear fuel. The waste contains both transuranic waste and fission products in concentrations requiring permanent isolation from the environment.

this supernate. As the concentrated supernate cools, salts, a waste material, precipitate to the bottom of the receipt tank. This solid, commonly known as salt cake, generally forms in the evaporator concentrate receipt tanks. The sludge layer remains in its original tank until a sludge processing campaign is executed. This campaign consists of seven steps over three to six years culminating in the operationally closing of waste tanks.

Liquid Waste Operations Accomplishments in 2011

SRR has committed to operationally closing old-style waste tanks. In 2011, considerable progress was made in preparing many of the old-style waste tanks ready for closure. For the first time in the history of SRS, 15 old-style tanks were in various stages of the seven-step process leading up to eventual operational closure. Tanks 18 and 19 are scheduled to be grouted and closed in 2012.

The seven-step process includes bulk waste removal, mechanical heel removal, chemical cleaning, cooling coil flushing, annulus cleaning, final sampling and isolation, and ends with the tank being filled with grout.

During 2011, SRR met a major milestone in tank closure by completing bulk waste removal activities on three of the old-style tanks (Tanks 4, 7 and 11) prior to September 30, 2011. In doing so, SRR complied with a U.S. Department of Energy, U.S. Environmental Protection Agency, and South Carolina Department of Health and Environmental Control authored Federal Facility Agreement, which serves SRR as a scheduling reference for tank closure.

A major accomplishment in sludge disposition was achieved in 2011 when the Defense Waste Processing Facility (DWPF), the largest radioactive waste glassification plant in the nation, utilized new bubbler technology to accelerate canister production and produced 267 canisters filled with glassified waste, which is a form suitable for long-term storage. The

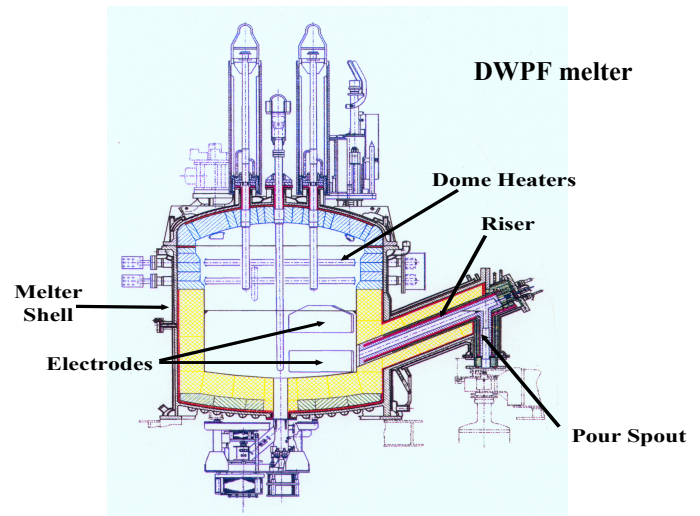
SRR continues to manage and disposition approximately 37 million gallons of high-activity liquid radioactive waste (about 309 million curies), which is stored in 49 large, shielded, and underground tanks grouped into two tank farms. Twenty-nine tanks are located in the H Area Tank Farm and 20 in the F Area Tank Farm. All SRS tanks are built of carbon-steel inside reinforced concrete containment vaults.

During the year, the major waste streams coming into the tank farms included transfers from H Canyon and a low-activity waste stream from the Defense Waste Processing Facility (DWPF). Fresh waste received from the processing of the spent nuclear fuel separates into two parts:

A sludge (which contains most of the radioactivity) that settles on the bottom of the tank.

A watery “supernate” that occupies the area above the sludge.

The supernate is transferred to an evaporator system, where it is processed further. The evaporator system reduces the volume of



SRS Environmental Report for 2011

267 canisters filled represented a new record in canisters poured in a single year. The previous record was 260 poured in 2004. The new record represented a 39 percent increase in production over the previous two years. The new bubbler technology, which injects argon gas into a molten glass and waste mixture, will increase the annual average production rate of waste canisters from 215 canisters a year to 325 annually.



Inclusion of the bubbler technology and subsequent replacement melters is expected to provide substantial life-cycle cost savings to DOE. Currently, DWPF is operating the second melter since operations began in 1996. A third melter with bubbler capability awaits installation when required. The original DWPF melter required replacement after six years of operation.

Since the DWPF began operations in March 1996, some 12.6 million pounds of glass have been poured and 40 million curies of radioactivity have been safely immobilized.

Removing and processing salt waste, which constitutes 90 percent of the total waste inventory stored in SRS's two tank farms, is another critical component in SRR's mission to operationally close the tanks and involves several SRS facilities including the Saltstone Production and Disposition Facilities.

The Saltstone facilities achieved an impressive milestone during the year by surpassing 10 million gallons of low-level salt waste being processed since initiating operations on June 12, 1990.

During the year, Saltstone marked other historic records. In June, Saltstone processed a record 519,821 gallons of salt waste during the month, exceeding the previous monthly high established in December 2009. During June, a weekly record of processing was achieved when Saltstone processed over 235,000 gallons. In total, Saltstone processed nearly 1.5 million gallons of salt waste in 2011.

SRR reached another salt waste processing milestone in 2011, this time by processing more than one million gallons of salt waste material through the Interim Salt Disposition Processing (ISDP) and Actinide

Salt Disposition Processing (ISDP) and Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit (ARP/MCU) facilities, which feeds waste material to Saltstone.

The ISDP began operations in April 2008 as an interim salt disposition system designed to remove nearly all radioactivity from salt waste solutions prior to its transfer to the Site's Saltstone facilities, which safely stabilizes and disposes the waste. The ISDP is referred to as "interim" because it was designed to operate while the Site's Salt Waste Processing Facility (SWPF) is being constructed. The ISDP is designed to process about one million gallons of waste a year, whereas SWPF will process about six to eight million gallons annually.

During the year, the ISDP performed at records rates for daily, weekly and monthly processing. In November, ARP/MCU exceeded a 2009 daily processing record by processing 11,259 gallons in a 24-hour period. In October, a weekly record was set when 56,511 gallons was processed. During the month of June, the ARP/MCU processed 131,613 gallons of salt waste for a new monthly record.

SRR became the Liquid Waste Operations contractor on July 1, 2009. The facilities included in the liquid waste contract are the two tank farms and their attendant three evaporators, DWPF, Saltstone facilities, and ARP/MCU. The contract focuses on waste disposition that leads to accelerated tank closure with the expectation of closing all old-style waste tanks by 2022.

Contributed by Rick Kelley, SRR Public Affairs



SRS Saltstone Facilities